

MODIS Team Meeting Minutes

Minutes of the MODIS Team Meeting held on Tuesday April 19, 1994.

Action Items:

73. Complete the MODIS brochure and released for printing. Assigned to Bauernschub 10/18/93. Due 11/15/93.

75. Determine if the four electronic module boxes can be individually thermal tested in air, or must the thermal testing be done in a vacuum. Assigned to Silva 10/26/93. Due 11/ 9/93

86. Complete CDR Action Items. Assigned to ALL 3/15/94. Due 4/ 7/94

The following items were distributed:

- 1) Weekly Status Report #134
- 2) SBRC Memos submission from week #126
- 3) Minutes of the previous team meeting

Attendees:

✓ Dick Weber	Bruce Guenther	✓ Larissa Graziani
✓ John Bauernschub	✓ George Daelemans	Bob Martineau
Rosemary Vail	John Barker	✓ Bob Silva
Lisa Shears	Patricia Weir	Ken Brown
Mike Roberto	Mitch Davis	✓ Robert Kiwak
Nelson Ferragut	Jack Ellis	✓ Harvey Safren
Gene Waluschka	Ken Anderson	✓ Ed Knight
✓ Bill Barnes	Rick Sabatino	✓ Marvin Maxwell
✓ Les Thompson	Cherie Congedo	Bill Mocarsky
	✓ Harry Montgomery	Rick Mills

MODIS Technical Weekly

April 22, 1994

General

NEW milestones for SBRC are needed NOW for the May thru August time period. Write-ups of the January thru April milestones should be started now.

A new version of the General Instrument Interface Specification has been released by Ray Taylor. It has changes 2 and 3 of revision A, dated April 11, 1994.

Systems and Calibration

The biweekly systems and calibration telecon was held on April 18. Participants included Tom Pagano, Neil Therien, Dzung Pham, Bill Barnes, Harry Montgomery, Ed Knight, and Mike Roberto. Topics covered included:

- 1) The possible use of Angular Displacement Sensors (ADSs) for MODIS was mentioned by Bill Barnes.
- 2) In response to Mike's concerns, Tom Pagano mentioned that detector personnel had indicated that there would be no problem operating the PC detectors warm.
- 3) It was mentioned that Gene Gochar has determined that a delta critical design review (CDR) for mechanisms will likely be needed.
- 4) It was mentioned that Jack Brooks had recommended the use of the graphite epoxy afocal telescope bench (ATB) and aft optics platform (AOP) in the mainframe (now the structural model) vibration test in Florida in June. Mike requested that Al DeForrest be informed that GSFC was interested in discussing this issue with him.
- 5) Any requests for data, etc. will be handled thru Ken Anderson. Possible items to be requested include:
 - a) Harry Montgomery would like to know if there is any data for the HIT detectors which GSFC could use for algorithms.
 - b) Ed Knight would like to know if there is a mirror motion algorithm which provides pointing versus encoder readout.
 - c) Ed is interested in the SRCA spectral algorithms or spreadsheets. These would be invaluable in helping GSFC determine that the SRCA should perform as expected.
 - d) Ed is interested if the non-proprietary portion of MSAP can be split off from the program for his use over the next six months during contract negotiations. In the meantime, he has given up all his MSAP disks to Harry and Mike.
6. Tom mentioned the following:
 - a) Waivers will be requested for the center wavelength of band 19 and the edge range of band 31.
 - b) SBRC is now looking at grounding, etc. for the dedicated MODIS calibration facility (DMCF). The integration and alignment collimator (IAC) will be used in conjunction with the DMCF.
 - c) Electrical checks of the detectors may not be possible during the radiant cooler test.
 - d) The scan mirror needs to be spun at 200 rpm to balance it. Schaeffer Magnetics does not like operating the scan motor at that speed. Normal speed is about 20 rpm. By increasing motor speed to 40 rpm, a four times improvement in static balance could be obtained (improvement goes with the square of the rpm).
 - e) Ken Shamordola now has a visible focal plane to use with his test station.
 - f) The integration of the near infrared (NIR) focal plane is nearly complete.
7. Neil mentioned the following:
 - a) He has completed the optical portion of the simulator.
 - b) The simulator is putting out digital numbers.
 - c) He makes use of the Sun workstation and the MAC .
8. Dzung Phan has been working with the gain and offset portions of the simulator.

Structural Model Test

A conversation with Al DeForrest was held on April 18 to discuss the pros and cons of using the graphite epoxy afocal telescope bench (ATB) and aft optics platform (AOP) in the mainframe (now the structural

model) vibration test in Florida in June. Participants included Al, Tom Wolverton, Dick Weber, and Mike Roberto. Tom mentioned the objectives of the test: qualify the mainframe, correlate with the model for the coupled loads analysis, and determine significant modes under 100 Hz. Tom noted that the optical bench assembly (OBA = ATB + AOP + radiative cooler) participation would be minor compared to the mainframe. Dick brought up the deep and wide notch that was used to qualify the graphite epoxy structures. The Florida test might be a chance to determine if the notch was reasonable. SBRC will consider the use of the graphite epoxy structures.

Flex Mounts

A meeting on the use of flex mounts for the modal survey portion of the Florida mainframe vibration test was held on April 19. Attendees included Ken Hinkle, Ralph Mollerick, Bill Case, Tom Venator, Cherie Congedo, and Mike Roberto. Concern was raised about doing a modal survey with flex mounts, doing other ground testing with steel kinematic mounts, and then using titanium kinematic mounts for flight. There was also concern about the spacecraft specification with Martin Marietta Astro Space (MMAS) which allows stiction of the kinematic mounts up to 50 inch pounds, considering the impact this could have on the mounts actually behaving in a kinematic fashion on orbit. Tom mentioned that the expected stiction was from 5 to 20 inch pounds. In general, Bill would not have a problem using the flex mounts for the modal survey and then using kinematic mounts for other testing and launch, since the boundary conditions would be known in both cases. However, preliminary information from the TIR structure modal test performed at MMAS attributed differences of 30 Hz (36 or 39 Hz to 73 Hz) to kinematic mount stiction. Bill Case was concerned that this frequency change might indicate a problem with the kinematic mounts related to their response which needs to be addressed. Finally, the kinematic mounts have heritage; and Cherie had the action item to talk with Sandra Irish about how these mounts had actually performed in a flight program. A recommendation on which mounts to use for the modal survey will follow after the previous use of the kinematic mounts is reviewed.

Detectors

Bob Martineau has found out that the 3 good W1 detector cables (four are needed) supplied by Graphics Research that SBRC stated it had are not good after all. The problem is with the annular rings at the end of the cables (hole locations or sizes). Apparently, it is not possible to do good soldering of pins through these holes. As mentioned before, there are three more W1 cables for which a contamination waiver is being requested. If the waiver is granted, there is still the question of whether the holes at the end of these cables are proper. A large lot of flight cables is process for June delivery. The contamination problem is believed to be material between layers (the cables are believed to be capton covered with layers of Cu, Ni, and Au). For making the holes a fixture is used to hold the cable and align the device for making the holes.

The process of making the new W1 cables and putting the holes in the end of the cable should be closely monitored, so that these problems do not occur again. It seems that the cables should be checked before the holes are drilled (punched?). There should be a way of assuring the alignment will be proper before putting holes in the flight cables. The holes should be put in one flight cable at a time and that cable should be checked before going on to the next cable. If there is a problem with the setup, there is no excuse for having the holes wrong on all cables.

To check for hybrid reliability (indium bump bond problem), SBRC has 3 mockups on invar and will be making 3 mockups on Be. However, Bob has determined the fanout detector assemblies (FDAs) will not be smaller than the readout integrated circuits (ROICs) for the cooled PV detectors. Also, the sapphire mockup is smaller than the sapphire motherboard. Failures of the indium bump bonds may occur after numerous temperature cycles. Thus the test mockup may be the only way to determine if the hybrid failure problem has been solved (possible 150 or so temperature cycles). Since bond failures may be a function of the size of the area that is bonded, test results from the mockup may not be conclusive.

There was a question of biasing the PC detectors warm that came up at the Critical Design Review. I discussed this with Tom Pagano and he queried his detector people in a memo dated April 12 th. Tom faxed me his questions and the responses from Don Thornton and Gordon Plews.

The following was included in Don Thornton's response: He stated the resistance of the warm PC detectors is of the order of 500 to 600 ohms, with a negative temperature coefficient. When biased with 0.4 mA, each detector would dissipate about 0.1 mW. The entire array would dissipate 6 mW. Assuming the thermal conductivity of CdTe is 0.7 W/cmK, this would give a rise of only 3 to 10 mK across the CdTe. Assuming the epoxy is ten times worse, the temperature rise would still be less than a Kelvin. If the bias supply is constant voltage and is set for 0.25 mW dissipation at operating temperature where the detector resistance is 1500 to 2000 ohms, the room temperature dissipation would be about 0.75 mW per detector or about 45 mW total. This would still lead to a temperature rise of less than a Kelvin.

Optics

Gene Waluschka has obtained a reference related to scatter from contaminated mirrors. The reference is:

"Scatter from Particulate-Contaminated Mirrors" Optical Engineering, August, 1992, Volume 31, Number 8 pages 746 to 784 It has parts 1 thru 4. The authors are Spyak and Wolfe.

Gene and Larissa will be looking into scan mirror scatter with consideration of expected contamination at launch and the expected contamination buildup during the mission.

Contamination

Larissa Graziani will be looking into the screen holes in the diffuser attenuator to determine if there is a contamination issue.

Mike Roberto April 22, 1994